

Claims

What is claimed is:

- [c1] A reconfigurable cache memory comprising:
a programmable memory unit;
a functional unit in communication with the programmable memory unit, wherein the functional unit executes applications using the programmable memory unit; and
reconfiguration module for determining an optimal configuration of memory for a particular application and programming the programmable memory unit to the optimal configuration.
- [c2] The reconfigurable cache memory of claim 1, wherein the programmable memory unit is a field-programmable gate array.
- [c3] The reconfigurable cache memory of claim 1, wherein the reconfiguration module supplies a vector representing the optimal configuration determined to the programmable memory unit.
- [c4] The reconfigurable cache memory of claim 1, wherein the reconfiguration module determines the optimal configuration by collecting performance information and analyzing the collected performance information.
- [c5] The reconfigurable cache memory of claim 1, wherein the programmable memory unit, the functional unit, and the reconfiguration unit are combined into a single system.

- [c6] A method of reconfiguring cache memory comprising:
determining an optimal configuration of memory for a particular application
executed by a functional unit using a programmable memory unit; and
programming the programmable memory unit to the optimal configuration.
- [c7] The method of claim 6, further comprising:
determining another optimal configuration of memory for another particular
application executed by the functional unit using the programmable
memory unit; and
programming the programmable memory unit to the another optimal
configuration.
- [c8] The method of claim 7, further comprising:
dynamically switching between programming the programmable memory unit to
the optimal configuration and the another optimal configuration based on
which application is being executed by the functional unit.
- [c9] The method of claim 6, wherein the determining of the optimal configuration of
memory for a particular application executed by a functional unit using a
programmable memory unit comprises:
collecting performance information; and
analyzing the collected performance information.
- [c10] The method of claim 6, wherein the programming of the programmable memory
unit comprises:
creating a vector representing the optimal configuration; and
sending the vector to the programmable memory unit.
- [c11] The method of claim 10, wherein a field programmable gate array configuration
generator tool creates the vector.

[c12] A reconfigurable cache memory comprising:

means for determining an optimal configuration of memory for a particular application executed by a functional unit using a programmable memory unit; and

means for programming the programmable memory unit to the optimal configuration.

[c13] The method of claim 6, further comprising:

means for determining another optimal configuration of memory for another particular application executed by the functional unit using the programmable memory unit; and

means for programming the programmable memory unit to the another optimal configuration.

[c14] The method of claim 7, further comprising:

means for dynamically switching between programming the programmable memory unit to the optimal configuration and the another optimal configuration based on which application is being executed by the functional unit.

[c15] The method of claim 6, wherein the means for determining of the optimal configuration of memory for a particular application executed by a functional unit using a programmable memory unit comprises:

means for collecting and analyzing performance information.

[c16] The method of claim 6, wherein the means for programming of the programmable memory unit comprises:

means for creating a vector representing the optimal configuration and sending the vector to the programmable memory unit.

- [c17] A reconfigurable cache comprising:
- a field-programmable gate array;
 - a functional unit in communication with the field-programmable gate array, wherein the functional unit executes applications using the field-programmable gate array; and
 - reconfiguration module for determining an optimal configuration of memory for a particular application and programming the field-programmable gate array to the optimal configuration,
 - wherein the reconfiguration module determines the optimal configuration by collecting performance information and analyzing the collected performance information.
- [c18] The reconfigurable cache of claim 17 wherein the reconfiguration module supplies a vector representing the optimal configuration determined to the field programmable gate array.
- [c19] The reconfigurable cache of claim 17 wherein the field programmable gate array, the functional unit, and the reconfiguration unit are combined into a single system.